

Claims

- [c1] 1. A conveying system comprising:
- a conveyor having an outer conveying side atop which articles are conveyed along a carryway in a direction of travel, the conveyor including:
- a transport element arranged to ride laterally across the outer conveying side of the conveyor transverse to the direction of travel; and
- a motor located with the transport element for driving and riding with the transport element across the outer conveying side of the conveyor.
- [c2] 2. A conveying system as in claim 1 wherein the transport element includes a housing covering the motor.
- [c3] 3. A conveying system as in claim 1 wherein the conveyor further includes a power source electrically coupled to the motor to power the motor.
- [c4] 4. A conveying system as in claim 3 wherein the power source is located with the motor and the transport element to ride with the motor and the transport element across the outer conveying side of the conveyor.
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- [c5] 5. A conveying system as in claim 3 wherein the power source comprises a storage cell.
- [c6] 6. A conveying system as in claim 3 wherein the power source comprises a capacitor.
- [c7] 7. A conveying system as in claim 3 wherein the power source is rechargeable.
- [c8] 8. A conveying system as in claim 1 wherein the conveyor further includes a local controller located with the motor to control the motor.
- [c9] 9. A conveying system as in claim 8 wherein the local controller includes a switch for turning the motor on and off.
- [c10] 10. A conveying system as in claim 8 further comprising a marker disposed along the carryway and wherein the local controller includes a sensor responsive

to the marker and sending to the local controller a sensor signal indicative of the proximity of the marker to the sensor.

- [c11] 11. A conveying system as in claim 8 further comprising a system controller capable of sending command signals to the local controller and wherein the local controller forms a communications link with the system controller for receiving command signals from the system controller.
- [c12] 12. A conveying system as in claim 11 wherein the communications link is a wireless link.
- [c13] 13. A conveying system as in claim 11 wherein the local controller is assigned an address and is responsive only to command signals that include the assigned address.
- [c14] 14. A conveying system as in claim 1 wherein the conveyor further includes a lateral track along which the transport element rides.
- [c15] 15. A conveying system as in claim 14 wherein the track includes a rack gear and wherein the conveyor includes a pinion gear coupled to the motor and that meshes with the rack gear to advance the transport element across the top conveying side of the conveyor.
- [c16] 16. A conveying system as in claim 14 wherein the track includes a cog belt and wherein the conveyor includes a cog wheel coupled to the motor and that engages the cog belt to advance transport element across the top conveying side of the conveyor.
- [c17] 17. A conveying system as in claim 1 wherein the transport element includes a pushing surface for pushing against conveyed articles.
- [c18] 18. A conveying system as in claim 1 wherein the transport element includes a platform surface for carrying conveyed articles.
- [c19] 19. A conveying system comprising:
a conveyor conveying articles in a direction of travel along a carryway, the conveyor including:

a plurality of transport elements arranged on the conveyor to ride along parallel lateral tracks transverse to the direction of travel; and a motor located with each of the transport elements to drive and ride with the transport element along one of the tracks.

[c20] 20. A conveying system comprising:

a modular conveyor belt including a series of rows of belt modules hingedly linked together, at least some of the rows of belt modules including:

a transport element arranged to ride laterally across the row; and a motor located with the transport element to drive and ride with the transport element across the row.

[c21] 21. A conveyor belt module, comprising:

a module body extending longitudinally from a forward end to a rearward end, transversely from a left edge to a right edge, and in thickness from a top side to a bottom side and suitable for being interconnected end to end to other module bodies to form a conveyor belt, the module body including a top track extending transversely across the top side of the module between the forward and rearward ends;

a transport element arranged to ride in the top track; and

a motor located with the transport element to drive and ride with the transport element along the top track.

[c22]

22. A modular conveyor belt, comprising:

a series of rows of hingedly interconnected belt modules extending in width from a left edge to a right edge and in thickness from a top side to a bottom side, wherein at least some of the rows include:

a slot in the top side of the row and extending along the width of the row;

a guide disposed in the slot;

a transport element arranged to translate across the width of the row along the slot; and

a drive mechanism located with the transport element to translate

with the transport element, the drive mechanism including:

a motor; and

a gear wheel rotated by the motor and engaging the guide to translate the transport element along the slot.

[c23]

23. A conveying system comprising:

a conveyor conveying articles in a direction of travel along a carryway, the conveyor including:

a lateral slot formed in the conveyor in a direction transverse to the direction of travel;

a guide residing in the slot;

a transport element arranged to ride along the slot;

a motor located with the transport element; and

a drive element driven by the motor and engaging the guide to drive the transport element along the slot.

[c24]

24. A conveying system comprising:

a conveyor conveying articles in a direction of travel along a carryway, the conveyor including:

a plurality of transport elements arranged on the conveyor to ride along parallel lateral tracks transverse to the direction of travel; and

a motor associated with each of the transport elements to drive the associated transport element along one of the tracks; and

a local controller associated with each of the transport elements and with the associated motor to control the activation of the motor.

[c25]

25. A conveying system as in claim 24 further comprising a sensor electrically connected to an associated local controller to provide a sensor signal indicative of a position along the carryway.

[c26]

26. A conveying system as in claim 24 further comprising:

a system controller external to the conveyor; and

a communications link between the system controller and the local controller.

- [c27] 27. A conveying system as in claim 24 wherein each of the transport elements has a uniquely associated motor.
- [c28] 28. A conveying system as in claim 24 wherein the motor is located with its associated transport element to ride with the transport along one of the tracks.
- [c29] 29. A conveying system as in claim 24 wherein the local controller is located with its associated transport element to ride with the transport element along one of the tracks.
- [c30] 30. A conveying system as in claim 24 wherein the motor is disposed at a fixed position in the conveyor.
- [c31] 31. A conveying system as in claim 24 wherein the local controller is disposed at a fixed position in the conveyor.
- [c32] 32. A conveying system comprising:
a slat conveyor conveying articles in a direction of travel along a carryway,
the slat conveyor including:
a plurality of parallel drag chains driven in the direction of travel;
a plurality of parallel slats attached to and spanning the drag chains, at least some of the slats including:
a lateral slot formed in the slat in a direction transverse to the direction of travel;
a transport element arranged to ride along the slot;
a motor arranged to drive the transport element along the slot; and
a local controller associated with the motor to control the activation of the motor.
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- [c33] 33. A conveying system as in claim 32 further comprising:
an electric power source external to the slat conveyor and including an ungrounded terminal; and
wherein the plurality of drag chains includes a powered drag chain electrically connected to the ungrounded terminal of the electric power source to power the motor.

[c34] 34. A conveying system as in claim 33 wherein the powered drag chain includes sockets along its length and wherein at least some of the slats include a prong that plugs into the sockets to provide the motor with electric power from the powered drag chain.

[c35] 35. A conveying system as in claim 32 further comprising a powered rail disposed in the slot.

[c36] 36. A conveying system as in claim 32 wherein the motor is located with the transport element to ride with the transport element along the slot.

[c37] 37. A conveying system as in claim 36 further comprising a powered conducting rail disposed in the slot and a brush extending from the transport element to contact the powered conducting rail to provide electric power to the motor.

[c38] 38. A conveying system as in claim 32 wherein the slat forms a cavity in which the motor is mounted.

[c39] 39. A conveying system comprising:
a slat conveyor conveying articles in a direction of travel along a carryway,
the slat conveyor including:

a plurality of parallel drag chains driven in the direction of travel;

a plurality of parallel slats attached to and spanning the drag chains, at least some of the slats including:

a lateral slot formed in the slat in a direction transverse to the direction of travel;

a transport element arranged to ride along the slot;

a motor arranged with the transport element to ride with and drive the transport element along the slot.

[c40] 40. A conveying system as in claim 39 further comprising:
an electric power source external to the slat conveyor and including an ungrounded terminal; and
wherein the plurality of drag chains includes a powered drag chain electrically connected to the ungrounded terminal of the electric power source to power the motor.

[c41] 41. A conveying system as in claim 40 wherein the powered drag chain includes sockets along its length and wherein at least some of the slats include a prong that plugs into the sockets to provide the motor with electric power from the powered drag chain.

[c42] 42. A conveying system as in claim 40 wherein the plurality of drag chains includes a grounded drag chain and wherein the electric power source includes a grounded terminal.

[c43] 43. A conveying system as in claim 40 further comprising a powered conducting rail disposed in the slot and a brush extending from the transport element to contact the powered conducting rail to provide electric power to the motor.

[c44] 44. A conveying system as in claim 39 further comprising a pair of guide rails formed along the slot and roller wheels extending from the transport element to roll along the guide rails as the transport element rides along the slot.

[c45] 45. A conveying system as in claim 39 further comprising a rack gear arranged along the slot.

[c46] 46. A conveying system as in claim 39 further comprising a cover belt attached at opposite ends to the transport element to cover the slot.

[c47] 47. A conveying system as in claim 46 further comprising belt grooves formed laterally along top and bottom sides of the slot and idler rollers at opposite ends of the slot about which the cover belt is looped to direct the cover belt between the belt grooves.

[c48] 48. A slat conveyor conveying articles in a direction of travel along a carryway, the slat conveyor comprising:

- a plurality of parallel drag chains driven in the direction of travel;
- a plurality of parallel slats attached to and spanning the drag chains, at least some of the slats including:

- a motorized transport element arranged to ride along the slat;
- wherein one of the drag chains is an electrically powered drag chain to provide electric power to drive the transport element along the slot.

- [c49] 49. A slat conveyor as in claim 48 wherein the electrically powered drag chain includes sockets and wherein the slat includes a prong that plugs into the sockets to make an electrical connection between the electrically powered drag chain and the slat.
- [c50] 50. A slat conveyor conveying articles in a direction of travel along a carryway, the slat conveyor comprising:
a plurality of parallel drag chains driven in the direction of travel;
a plurality of parallel slats attached to and spanning the drag chains; and
an external electric power source having an ungrounded terminal electrically connected to one of the drag chains.
- [c51] 51. A slat conveyor as in claim 50 wherein the external power source includes a grounded terminal and wherein the slats are grounded.
- [c52] 52. A slat conveyor as in claim 50 wherein the external power source includes a grounded terminal and wherein another of the drag chains is grounded.
- [c53] 53. A slat conveyor as in claim 50 further comprising a motor stationarily mounted in a cavity formed in one of the slats.
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- [c54] 54. A slat conveyor as in claim 50 wherein the slats include a track, a transport element, and a motor arranged to ride along the track with the transport element.